

semimajor axis less than 1 AU		semimajor axis greater than 1 AU	
Q < 0.983 AU	Q > 0.983 AU	q < 1.017 AU	q < 1.017 AU
"Apohele"	Aten	Apollo	Amor
approaches from inside	crosses the orbit of the Earth		approaches from outside

Lightning Strikes Twice: Tucker Wins Second Benson Prize

As reported in the last installment of News Notes, Jim Benson of the Space Development Corporation has put up \$5,000 as prize money to encourage amateur astronomers to find Earth-crossing asteroids. The first ten amateur discoveries will each receive \$500. The first discovery to qualify for the prize was

the Aten-class object 1997 MW1, found last June 29 by Roy Tucker of Tucson, Arizona. The second discovery to qualify is the Apollo-class object 1998 FG2, also found by Tucker.

Tucker's discovery came on March 21 this year; his goal is to cut down on the nine-month interval between his NEO discoveries.

The Ramans Do Things In Threes

The title of this news item is taken from one of the great closing lines in science fiction. It seemed appropriate, because Mr. Tucker has also found Earth-crossing asteroids in threes. On April 21, he discovered 1998 HE3, an Aten-class object. Two of his three discoveries are members of the Aten group. It qualifies him for the third Benson Prize, and is so far the only person to win one.

Obviously, Tucker succeeded at his goal of cutting down on the interval between his NEO discoveries.

ASTEROID PHOTOMETRY OPPORTUNITIES NOVEMBER-JANUARY

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The table below lists asteroids that come to opposition during the months of November through January that represent useful targets for photoelectric or CCD photometry observations. Observations are typically needed because the asteroid has either an unknown or ambiguous rotational period. The table gives (in order of opposition dates) the asteroid number and name, opposition date, opposition V magnitude, the rotational period (in hours), the estimated lightcurve amplitude (in magnitudes), and the designation PER if observations are needed to determine the rotational period. AMB implies that previous period determinations have given ambiguous results and these alternate periods are listed in the table. Question marks are used to denote uncertain or unknown values.

Now that many amateur and other small observatories have CCD capabilities, much fainter targets are accessible to them. Therefore, we have included a selection of fainter targets, down to opposition magnitude 15. Our emphasis among these fainter targets is to reach to the smallest size bodies possible within that magnitude limit. Thus the objects listed tend to be inner-belt asteroids, or even Mars or Earth-crossing objects, at unusually favorable oppositions. To achieve this, we filter the list of all oppositions to include those objects with H (absolute) magnitude >14.0 (roughly <5 km in diameter), but opposition V magnitude <15.0, and then further eliminate any objects for which adequate observations have already been made. Our criteria for the brighter objects remains the same: opposition V magnitude <12.0 and that the period is unknown, very uncertain, or ambiguously determined. We have dropped low phase angle as a criterion for inclusion, as it seems no one has responded to past listings suggesting phase relation observations.

Ephemerides for any solar system object can be calculated with the HORIZONS program; see the web page at <http://ssd.jpl.nasa.gov/>. Finder charts for some of these asteroids may appear in the *Minor Planet Observer*. For information on this publication, contact: Brian D. Warner, Box 818, Florissant, CO 80816.

Asteroid	Opp'n Date	Opp'n V Mag	Per	Amp	
181 Eucharis	Nov 11	11.9	>24	0.1	PER
6485 Wendeesther	Nov 19	14.5	?	?	PER
1996 FG3	Nov 25	14.3	?	?	PER
5732 1988 WC	Dec 11	14.4	?	?	PER
4558 Janesick	Dec 21	14.4	100	>0.1	PER
351 Yrsa	Jan 10	11.7	?	?	PER
206 Hersilia	Jan 27	12.0	7.33?	0.1	PER
240 Vanadis	Jan 28	11.7	?	?	PER

Asteroid Photometry Opportunities